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AMSAT NEWS SERVICE
ANS-176

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The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

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ANS-176 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2023 June 25

Two Awards Available from AMSAT-UK Regarding EO-88's Impending Re-Entry

As you may be aware, Solar Cycle 25 has already shown that we cannot yet predict what the sun will be doing with any great accuracy.

Sunspots, X-class solar flares and CMEs (coronal mass ejections) are increasing in frequency and intensity on a daily basis.

The peak of Solar Cycle 25 was not expected until late 2024 or early 2025 but it may be coming earlier and have a higher intensity than was predicted.

One result of this increased activity is that the upper atmosphere and ionosphere of the earth becomes warmer and expands upwards. This means that spacecraft in low earth orbit experience more drag or resistance as a result of the increase in the number atoms they are having to displace as they travel around the globe. As a consequence, the spacecraft loose more

kinetic energy and start to descend lower in orbital height, which, of course, makes the problem worse and a fiery end to the spacecraft is hastened.

The actual effect is also dependant on the drag coefficient of the particular spacecraft…simply how much mass (the more the better) to how much surface area (the less the better). So in CubeSat terms, a 1U CubeSat, fairly full of stuff with a mass near the maximum of 1.3kg, will probably be better off than a half empty 3U CubeSat with deployable solar panels and other drag inducing protuberances.

All TLEs (Two Line Elements) include a parameter called drag, it is usually a very small number preceeded by four or more zeros! Although this parameter is calculated by the system, it is not usually precise or even stable, so cannot be used to accurately predict deorbit dates when looking forward many weeks/months. It can give us a guide though! Alarm bells should ring when we only see two leading zeros.

How does this effect our activities? Well for the FUNcube family, there are presently three active members!

FUNcube-1, AO-73 was launched almost ten years ago in November 2013 into an elliptical polar orbit of approx 682×595 km. Presently those numbers are around 640×570 km so probably not too much to worry about. The drag number from the TLEs is, at the time of writing, 0.000074, a good number.

The same applies to JY1SAT, JO-97. This was launched in December 2018 into a 573×590 km polar orbit. Presently those numbers are around 557×573 km and the current drag is listed as 0.000076.

Unfortunately, however, the same cannot by said for Nayif-1, EO-88. This spacecraft was launched in February 2017 into a 496×507 km polar orbit. Currently the orbit parameters show a height of around 320 km with the drag at 0.00319. It is now well below the ISS and much lower than at launch.

As mentioned, largely due to the random nature of the our star’s flux output on a day to day basis, it is not possible at this stage to accurately predict the likely deorbit date but it seems that it will certainly be before the end of this year. As the spacecraft continues to perform 100% nominally this is a great shame. Presently it is switching autonomously from high power telemetry when in daylight and with lower power telemetry and the transponder active when in darkness. The solar panels, battery and power system also continue to be reporting nominal numbers, essentially unchanged since the day of launch.

It will therefore be a really sad moment when re-entry occurs but in the meantime everyone is encouraged to use the spacecraft whilst it remains available.

To mark the event of EO-88/Nayif’s demise, AMSAT-UK is offering two awards. These will be individual framed certificates.

Firstly, to the station who submits the last telemetry to the FUNcube Data Warehouse and also to who “guesses” or calculates the re-entry time and date most accurately. Submissions for this award must be made to EO88(a)amsat-uk.org before midnight (UTC) on July 4th 2023. So time is short to get your entries in. Good luck!

[ANS thanks AMSAT-UK for the above information]

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an image of AMSAT-OSCAR 10.
 Join the AMSAT President's Club today and help
Keep Amateur Radio in Space!
 https://www.amsat.org/join-the-amsat-presidents-club/
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SpaceX's autonomous collision-avoidance system performed 26,037 orbital avoidance maneuvers with its Starlink satellites in the two-year period between Dec. 1, 2020 and Nov. 30, 2022. That means each Starlink satellite of the nearly 4,000 that have been launched to date performed, on average, 12 avoidance maneuvers during that time.

But the size of SpaceX's current constellation is less than 10% of what the company plans to deploy. Within the next 10 years, the number of Starlink satellites in orbit may rise to 42,000. Add to that the up to 4,000 satellites that OneWeb wants to launch, another 3,200 of Amazon's Kuiper craft and 13,000 satellites of China's envisioned Guowang system, and it becomes obvious that things are set to get much more heated.

According to the FCC document, SpaceX claims that each of its satellites has a sufficient amount of fuel on board to perform 350 collision-avoidance maneuvers over its expected five-year lifetime. But that number could be reached remarkably soon, according to Lewis' calculations. In short, less than five years from now, Starlink satellites may be running out of fuel in a shorter period of time than their designed lifetime because of the sheer number of avoidance maneuvers they will have to perform.

[ANS thanks Tereza Pultarova, writing for Space.com, for the above information]

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The crossband repeater continues to be active. If any crewmember is so inclined, all they have to do is pick up the microphone, raise the volume up, and talk on the crossband repeater. So give a listen, you just never know.

Comments on making general contacts

I have been seeing a lot of traffic on Facebook and I suspect on other social media sites with people asking why they are not hearing the crew make general contacts. First off the crew is very busy on the ISS and they simply may not have the time to just pick up the microphone and talk. Also, one needs to be aware of their normal daily schedule. I have listed below the constraints that we at ARISS have to follow in order to schedule the school contacts. Hopefully this will help you better schedule your opportunities.

Typical daily schedule

Wakeup to Workday start= 1.5 hours
Workday start to Workday end=12 hours
Workday end to Sleep= 2 hours
Sleep to wakeup= 8.5 hours

The crew's usual waking period is 0730 - 1930 UTC. The most common times to find a crew member making casual periods are about one hour after waking and before sleeping, when they have personal time. They're usually free most of the weekend, as well.

SSTV events are not that often. So please check out https://www.ariss.org/ for the latest information or watch for the ARISS announcements.

And don’t forget that the packet system is active.

As always, if there is an EVA, a docking, or an undocking; the ARISS radios are turned off as part of the safety protocol.

ARISS Radio Status

Columbus Module radios:
IORS (Kenwood D710GA) – STATUS - Configured. Default mode is for cross band repeater (145.990 MHz up {PL 67} & 437.800 MHz down).
* Powering off for Russian EVA targeting July 26. OFF July 25 about TBD. ON July 27 about TBD.
* Capable of supporting USOS scheduled voice contacts, packet and voice repeater ops.

Service Module radios:
IORS (Kenwood D710GA) – STATUS - Configured. Default mode is fo packet operations (145.825 MHz up & down)
* Powering off for Russian EVA targeting July 26. OFF July 25 about TBD. ON July 27 about TBD.
* Capable of supporting ROS scheduled voice contacts, packet, SSTV and voice repeater ops.

The latest information on the operation mode can be found at https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

Upcoming Satellite Operations

Adrian (AA5UK) is heading back to the Cayman Islands. He will be operating as ZF2AE/ZF8 from Little Cayman June 25 to June 29th (EK99wp). He plans to rent a car June 28th/29th and will try to make it to FK09 grid at the other end to the island, time permitting. He will operate from Grand Cayman as ZF2AE June 30th to July 3rd (EK99ki) with focus on cross Atlantic contacts via AO7, RS44, FO-29 and IO-117. He will be relocating to Seven Mile Beach to operate from July 4th – July 7th in EK99hi and will try to mix it up on the passes with focus on Western passes.

The gear will be FT-1634 with Alaskan Arrow antenna. For IO-117, he will be using an IC-7000. Operation will be holiday style. Please follow him on Twitter @ZF2AE and @AA5UK and watch for the latest announcements. He also plans to periodically operate HF with focus on RTTY, FT8/FT4 and other digital modes. QSL information on QRZ.com. LOTW preferred.

[ANS thanks Ian Parsons, K5ZM, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

+ AMSAT Space Symposium and Annual General Meeting
  October 20-21, 2023
  Dallas, Texas

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

AMSAT Ambassador Clint Bradford, K6LCS, says,

"Think a 75-minute presentation on "working the easy satellites" would be appropriate for your club or event? Let me know by emailing me at k6lcsclint (at) gmail (dot) com or calling me at 909-999-SATS (7287)!"

Clint has NEVER given the exact same show twice: EACH of the 150+ presentations so far has been customized/tailored to their audiences. An email message received after a recent presentation:

"I really enjoyed Clint's presentation last night. The fact that he had taken the time to research and know something about his audience and welcomed interaction made it very informative and enjoyable. This was a refreshing change from many canned YouTube presentations I've tried to watch, which were poorly done, fuzzy video or muddy audio, or a badly prepared presenter stumbling his way through, with any valuable info lost along the way. Thanks for hooking this one up."

[ANS thanks Clint Bradford, K6LCS, and AMSAT for the above information]

Satellite Shorts From All Over

+ For rocket geeks, an interesting video shows the dynamics of SpaceX’s new

stage separation technique, which will be tested on Starship, separating the booster and upper stage without pusher pistons (like Falcon) or explosives (like many traditional rockets). The video may be found at https://www.youtube.com/watch?v=yesni8HUEA4 (ANS thanks The Orbital Index for the above information)

+ Although their identities have been widely circulated previously, the European Space Agency (ESA), on June 20, formally announced the personnel who will make up SpaceX Crew-7. They are NASA astronaut Jasmin Moghbeli, KI5WSL, commander; ESA astronaut Andreas Mogensen, KG5GCZ, from Denmark, who will serve as pilot; as well as JAXA astronaut Satoshi Furukawa, KE5DAW, from Japan, and Roscosmos cosmonaut Konstantin Borisov, from Russia, who will both serve as mission specialists. This crew will launch from Cape Canaveral in Florida later this summer on a SpaceX's Crew Dragon, and will remain aboard the International Space Station (ISS) for approximately six months. (ANS thanks ESA for the above information)

+ Spei Satelles is a 3U CubeSat created by the students and teachers of the Polytechnic of Turin. During its stay in orbit, Spei Satelles will transmit a radio signal that can be received by amateurs. The signal contains messages of hope from the magisterium of Pope Francis. Spei Satelles (the Latin words for Satellite of Hope) operates in a sun-synchronous low Earth orbit at about 525 km of altitude from the Earth's surface. At a frequency of 437.5MHz (Editor's note - this satellite is not coordinated by the IARU and AMSAT encourages radio amateurs to decline to offer telemetry collection or other technical support to groups that launch satellites that are not IARU coordinated and do not offer amateur communications opportunities) it transmits GMSK at 9600 bit/s AX.25. Spei Satelles also contains a nanobook, a 2x2x0.2 mm silicon slab on which the images, speeches, and readings by Pope Francis on March 27, 2020, in the midst of the pandemic, were imprinted by nanotechnologies. The satellite hitched a ride aboard Space X's Falcon 9 rocket launching from the Vandenberg Space Force Base in California on June 10, after being blessed by Pope Francis on March 29 at his General Audience in St. Peter's Square. (ANS thanks Religion News Service and Polytechnic of Turin for the above information)

+ Congratulations to Olivier Tymkiw, HB9GWJ, on receiving AMSAT Rover Award # 077! To earn the AMSAT Rover Award, participants must accumulate a combined total of 25 points through various achievements in portable satellite operations outside their home grid square. The AMSAT Rover Award was established to recognize and honor the accomplishments of satellite operators who engage in rover operations. Rover operations involve the activation of grid squares outside one's home grid, utilizing various satellite transponders and modes to establish communication links. A breakdown of the points system along with a list of past AMSAT Rover Award recipients can be found at https://www.amsat.org/amsat-rover-award/. Keep on roving, Olivier, and continue to inspire others in the AMSAT community!

+ Virgin Galactic will launch its first commercial spaceflight on June 27th.
https://www.space.com/virgin-galactic-first-commercial-spaceflight-june-2023
(ANS thanks space.com)

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary

years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor,

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